Space Weather Forecast

Issued on Thursday, 12 September 2024 at 13:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Ongoing CME influence, with further arrival forecast late day 2 or early day 3 (11-12 Sep). G1-G2 Minor to Moderate storms expected day 1 and likely day 3 (11 and 13 Sep). Moderate to High solar activity.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High with a strong (X-class) flare from a new region on the southeast limb, yet to be visible on Earth-facing disc. There are ten sunspot regions, including this one, with six of these forming a cluster of small sunspots in the southwest disc. The most notable is on the west limb, which was the source of the largest Moderate-class flares at 12/0022 UTC. A further region just west of north-centre disc is also of note, with a weak mixed magnetic polarity spot ahead of its main large symmetrical trailer spot, leading to some increasing complexity. The other main spots on the disc are have shown signs of simplifying and remain relatively inactive.

There were no Earth-directed CMEs (coronal mass ejections) observed in this period.

Solar Wind / Geomagnetic Activity: Two CMEs were observed arriving, the first from the 08 Sep CME at 11/1425 UTC and the second has been preliminarily assessed as being an early arrival of the 10 Sep CME at 12/0253 UTC Solar wind speeds rose slightly but stayed near background with the first arrival, then rose again with the second to ultimately peak around 500-550km/s at times. The Interplanetary Magnetic Field (IMF) was initially Weak, but increased to Moderate with the arrival of the first CME. This rose further with the second CME, becoming Moderate to Strong, in the range with peak strength 12/0935 UTC. The north-south component remained unremarkable with the first arrival, but became mainly negative (southward) from 12/0340 UTC with brief positive (northward) spells with periods of Moderate to Strong southward field. Geomagnetic activity was Quiet to Unsettled with the first arrival, but became Active to G2 Moderate Storm from 12/0600-1200 (Kp 4-6).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at near background, continuing to ease after recent enhancements.

Four-Day Space Weather Forecast Summary

Solar Activity: High to moderate activity expected with Moderate class flares expected and a slight chance of further Strong (X-class) flares.

Solar Wind / Geomagnetic Activity: Current CME influence is expected to ease later day 1 and into day 2 (12-13 Sep), before a further arrival is anticipated. This is from a CME produced by a Moderate flare from the sunspot on the north disc at 10/2350 UTC. This is forecast to arrive either very late on day 2 or early on day 3 (13-14 Sep). Coronal hole fast winds could potentially arrive day 4 (15 Sep). Geomagnetic activity is expected to be Active to G2 Moderate Storm at first day 1 (12 Sep), with a chance of an isolated G3 Strong Storm, before easing to Quiet to Active with a chance of G1 Minor Storms day 2 (13 Sep). A further enhancement likely follows to Active to G2 Moderate Storms day 3 (14 Sep). Quiet to Active conditions returning later day 3-4 (14-15 Sep).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy

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protons) is forecast to remain at near background, but with a slight chance of enhancement given any further notable flares, especially from the sunspots on the southwest limb.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	80	30	60	5
Strong	G3	No	30	5	10	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	75	75	70	70
Very Active	R3 to R5 X	Yes	20	20	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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